REMARKS

This amendment, submitted in response to the Office Action dated December 24, 2002, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-8, 31-36, and 59-61 have been examined, and of the examined claims, 32, 33, 34, 36, 60, and 61 have been withdrawn from consideration. Claim 59 is rejected under 35 U.S.C. § 112, first paragraph, and claims 31 and 59 are rejected under 35 U.S.C. § 112, second paragraph. Further, claims 1-4, 5-8, 31, 34, and 59 are rejected under 35 U.S.C. § 103(a). Applicant submits comments as follows.

Claim 59 is rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. The Examiner's rejection appears to be requiring verbatim support for the claim language, which is improper. Nonetheless to expedite prosecution of this case, Applicant submits that the non-narrowing amendment above, will overcome the rejection.

Claims 31 and 59 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant believes the non-narrowing amendments to the claims, as shown above, will overcome these rejection.

Regarding claim 31, the Examiner argues that the phrase "e.g." renders the claim indefinite. Applicant has deleted the phrase "e.g."

Regarding claim 59, which has now been amended, the Examiner argues that essential structural cooperative relationships of elements are omitted. Specifically the Examiner cites the output voltage, which is now not recited in amended claim 59, and power source. Applicant notes that claim 5 recites an electric field imparted to the photoconductive material and claim 8 recites a fluctuation suppressing means which suppresses fluctuations in the image signal due to fluctuations in the electric field. The voltage power source is the source of the electric field imparted to the photoconductive material. Thus, there is a structural connection between the voltage power source and the electric field, and in turn between the voltage power source and the image signal that is read out.

Claims 1-4, 5-8, and 59 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Van den Bogaert (research Disclosure 34264, October 1992) in view of Tsuji et al. (US 5,196,702, hereafter "Tsuji") and Takahashi et al. (US 5,059,794, hereafter "Takahashi"). Applicant believes that claim 1 is patentable over the references.

Applicant refers the Examiner to the Amendment filed October 10, 2002. Applicant believes the arguments made therein for distinguishing over Van den Bogaert and Tsuji are still valid. Applicant notes the Examiner has not offered any rebuttal as to why Tsuji would not be modified to provide an avalanche effect during the reading stage. Rather, Tsuji provides an avalanche effect during recording and thereafter attempts to maintain equilibrium. One skilled in the art would not modify Tsuji to provide an avalanche effect during image read-out.

Takahashi relates to a radiation imaging sensor as shown in Fig. 1, and described in col. 5, line 39, to col. 6, line 24. First, a ray of light is radiated while a 150V voltage is being applied

between the electrodes 2-1 and 2-2. As a result, electrons and positive holes are induced on the surface of the insulating layer (8). Electron propagation does not occur at this time because the voltage between the electrodes is low.

Next, the voltage between the electrodes is held at 240V. The X-rays are radiated under this state and converted to light by the phosphorescent member 1. The light is absorbed by the photoconductor layer and electron/positive hole pairs are generated. The electron/positive hole pairs cause avalanche multiplication. Finally, the positive holes reach the surface of the insulating layer and the charge that has previously been induced decreases due to recombination. In this manner, the image information is formed as propagated charge patterns on the insulating layer surface.

Then, the voltage between the electrodes is set to 150V by the switch. Charging in accordance with the discharge quantity is made by scanning the photo-conductor layer by the rays of light contracted to a necessary pixel size. The inflowing current developing at this time is detected by use of the amplifier 7.

It can be seen from Fig. 3 that no propagation occurs below the applied voltage of 180V. The range of the applied voltage is preferably from 180V to 300V.

The Examiner argues that Takahashi teaches applying an electric field to the photoconductive material sufficient for avalanche multiplication in order to increase optical detection sensitivity when using a laser stimulable phosphor.

However, claim 1 recites that the electric charges generated in the photoconductive material layer upon exposure to the stimulated emission are detected by applying an electric field, where the electric field is such as to generate an avalanche amplification effect.

By contrast, during read out of an image in Takahashi, there is no indication that an electric field capable of generating an avalanche effect is applied to the photoconductive material during exposure to stimulating emissions. In this regard, Takahashi has the same deficiency as Tsuji.

Takahashi teaches that there is no electron propagation, or avalanche multiplication, at 150V. However, the detection of the electric charges, the inflowing current, is detected by use of the amplifier 7, while the voltage between the electrodes is set at 150V. Thus, an electric field, where the electric field is such as to generate an avalanche amplification effect, is not applied simultaneously with detection as claimed.

Since, claim 1 recites the electric charges is detected by applying an electric field, where the electric field is such as to generate an avalanche amplification effect during exposure to stimulating emissions. Takahashi does not teach detecting the electric charges by applying an electric field, where the electric field is such as to generate an avalanche amplification effect.

Since, Takahashi does not teach or suggest every limitation of claim 1, claim 1 is patentable over Takahashi. Further, Van den Bogaert and Tsuji do not make up the deficiencies of Takahashi. Thus claim 1 is patentable over the references, and claims 2-4 are patentable by virtue of their dependency.

Similarly, claim 5 recites detecting electric charges generated in the photoconductive material layer by applying such an electric field as to generate an avalanche amplification effect.

Thus, applying the same argument as above, claim 5 is patentable over the references, and claims 6-8 and 59 are patentable by virtue of their dependency.

In addition, claims 4 and 8 are separately patentable over the references. Examiner admits that Van den Bogaert does not teach suppressing fluctuations in the electric field. However, Tsuji and Takahashi do not make up for the deficiency of Van den Bogaert. Tsuji and Takahashi merely teach that there is a relationship between quantum efficiency and the applied electric field.

Even if, *arguendo*, constant quantum efficiency indicates a constant applied electric field, we see no suggestion to suppress fluctuations in the electric field in either reference. The Examiner cites equation 4 in support of his argument. However, equation 4 recognizes other quantities related to the conversion of light into charge. The number of photons per pixel (L) or the efficiency of incidence of light into the photoconductive layer (k) may also indicate an improved charge output according to equation 4. It is not necessary to suppress the electric field, when other quantities could also be suppressed. There is no specific teaching in either reference to suppress the fluctuations of the applied electric field.

In addition, claim 59 is separately patentable over the references. Applicant sees no teaching or suggestion of correcting the image signal according to the fluctuations of a voltage power source during read-out of the image signal. The Examiner has not pointed to anywhere in

the reference that teaches or suggests correcting the image signal according to the fluctuations of a voltage power source during read-out of the image signal.

Claims 31 and 34 have been rejected under 35 U.S.C. § 103 as being unpatentable over Van den Bogaert in view of Tsuji, Takahashi, and further in view of Hunter et al (US 6,192,105, hereafter "Hunter").

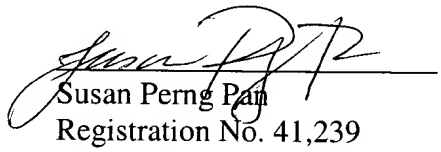
The Examiner maintains that the combination of Van den Bogaert, Tsuji, Takahashi, and Hunter teaches each feature of these claims. The Examiner does not point to anywhere in Takahashi that teaches a preliminary read-out signal bearing image information. The Examiner correctly concedes that Van den Bogaert and Tsuji do not teach a preliminary read-out signal bearing image information thereon, but cites Hunter to make up for this deficiency. The Examiner specifically cites the automatic exposure control device for teaching this feature. However, the automatic exposure device determines X-ray levels and does not interfere with the creation of image-bearing information. Accordingly, the automatic exposure control does not create a signal that bears any image information as the Examiner contends. See col. 6, lines 14-17. The alternative embodiment of Fig. 7 operates in a similar manner as that described in col. 6 and therefore, the Examiner's reliance on Fig. 7 for teaching the preliminary read-out as described by claims 31 and 34 does not support the rejection. The Examiner has failed to provide any rebuttal as to why Hunter lacks the preliminary read-out as claimed.

Applicant further adds claims 62-63 to describe features of the invention more particularly.

In view of the above, Applicant submits that claims 1-8, 31-36 and 59-63 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

31. (Amended) An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer on the stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to stimulated emission from the stimulable phosphor sheet and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated emission emitted from the stimulable phosphor sheet upon exposure to stimulating light, and detecting electric charges generated in the photoconductive material layer upon exposure to the stimulated emission by applying an electric field to the photoconductive material layer, wherein the improvement comprises the steps of

using a solid image sensor whose photoconductive material layer also exhibits electric conductivity upon exposure to recording light bearing thereon image information ~~(e.g., the radiation passing through the object)~~ or momentary light emitted from the stimulable phosphor layer upon exposure to the recording light,

projecting the recording light onto the stimulable phosphor sheet while applying an electric field to the photoconductive material layer, and

detecting charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer, thereby obtaining a preliminary read-out image signal bearing thereon image information.

59. (Amended) The image read-out system of claim 8 wherein the ~~voltage~~ fluctuation suppressing means corrects the image signal according to the fluctuations of a voltage power source during read-out of the image signal ~~monitors an output voltage during image read out and corrects the voltage of a power source based on stored voltage correction data~~.

Claims 62-63 are added as new claims.